WHAT IS CLAIMED IS:

1. A dual feedback control system for maintaining the temperature of an IC-chip near a set-point while said IC-chip dissipates a varying amount of electrical power; said system being comprised of:

an evaporator for a liquid refrigerant, and an electric heater which has one face connected to said evaporator and an opposite face for coupling to said IC-chip;

an evaporator controller coupled to said evaporator, and a heater controller coupled to said electric heater;

said heater controller including a first feedback circuit means for sending electrical power to said electric heater with a variable magnitude that compensates for changes in said IC-chip power; and,

said evaporator controller including a second feedback circuit means for passing said liquid refrigerant to said evaporator with a variable flow rate that reduces electrical power usage in said heater over the power usage which occurs if said flow rate is fixed.

2. A dual f edback control system according to claim 1 wherein said electric heater generates heat with quick changes in magnitude in comparison to said evaporator controller which includes a valve that adjusts said flow rate of said liquid refrigerant with substantially slower changes in magnitude.

3. A dual feedback system according to claim 2 wherein said second feedback circuit means senses the instantaneous power to said electric heater, and sends said liquid refrigerant to said evaporator with a flow rate that -a) decreases if the average of the sensed power to said electric heater over a certain time interval is above an upper power limit, and b) increases if said average over said time interval is below a lower power limit.

4. A dual feedback system according to claim 3 wherein said upper power limit is at least twice said lower power limit.

5. A dual feedback system according to claim 2 wherein said second feedback circuit means senses the instantaneous power to said electric heater, and sends said liquid refrigerant to said evaporator with a flow rate that -a) decreases if the average of the sensed power to said electric heater over a certain time interval is above a particular power limit, and b) incr ases if said average over said time interval is below said particular power limit.

6. A dual fe dback control system according to claim 2 wherein said second feedback circuit means senses the temperature of said evaporator, and sends said liquid refrigerant to said evaporator with a flow rate that -a) decreases if said set-point minus the temperature of said evaporator is more than a maximum difference, and b) increases if said set-point minus the temperature of said evaporator is less than a minimum difference.

7. A dual feedback control system according to claim 6 wherein said second feedback circuit keeps said evaporator 30°C to 50°C colder than the temperature of said IC-chip.

8. A dual feedback control system according to claim 2 wherein said second feedback circuit means senses the temperature of said evaporator, and sends said liquid refrigerant to said evaporator with a flow rate that -a) decreases if said set-point minus the temperature of said evaporator is more than a particular difference, and b) increases if said set-point minus the temperature of said evaporator is less than said particular difference.

9. A dual feedback control system according to claim 2 wherein said first feedback circuit means reads the temperature of said IC-chip from a sensor in said IC-chip, and sends electrical pow r to said electric heater with a magnitude that -a) increas s as the temperature of

said IC-chip decr ases below said set-point and b) decreases as the temperature of said IC-chip increases above said set-point.

10. A dual feedback control system according to claim 2 wherein said first feedback circuit means estimates the temperature of said IC-chip as a function of the temperature from one sensor on said evaporator and another sensor on said electric heater, and sends electrical power to said electric heater with a magnitude that -a) increases as the temperature of said IC-chip decreases below said set-point and b) decreases as the temperature of said IC-chip increases above said set-point.

11. A dual feedback control system according to claim 2 wherein said evaporator controller includes a programmable member which stores signals that set said upper power limit and said lower power limit.

12. A dual feedback control system according to claim 2 wherein said second feedback circuit determines said average heater power by sensing and filtering the instantaneous power to said electric heater.

13. A dual feedback control system according to claim 2 wherein the combination of said evaporator, said electric heater, said heater controller, and said evaporator controller are replicated in said system multiple times such that each combination maintains the respective temperature of a respective IC-chip near a respective set-point.

14. A dual feedback control system according to claim 2 wherein said evaporator controller opens and closes said valve with a pulse-modulated control signal.

15. A dual feedback control system according to claim 2 wherein said evaporator controller opens and closes said valve to a degree that is selected with the amplitude of a analog control signal.